FLUORIDE PROGRAM SUMMARY

1985

Alberta
ENVIRONMENT
Pollution Control Division

FLUORIDE PROGRAM

SUMMARY

1985

PREPARED BY:

Municipal Engineering Branch
Pollution Control Division
Environmental Protection Services
Alberta Environment

ABSTRACT

This report summarizes the monthly fluoride record sheets compiled by the communities that artificially fluoridate their water supplies. There were 51 communities in Alberta that fluoridated their water in 1985, and 21 communities that purchased treated water from communities that fluoridate. The percentage total of Albertans on public water supplies using fluoride adjusted water is 53.7%. The amount of water fluoridated was 186,000,000 m^3.

TABLE OF CONTENTS

ABSTRACT i

TABLE OF CONTENTS ii

INTRODUCTION 1

DISCUSSION 2

RESULTS 4

LIST OF TABLES

TABLE I: ABBREVIATIONS 5

TABLE II: FLUORIDE SUMMARY STATISTICS 6

TABLE III: COMMUNITIES USING FLUORIDE ADJUSTED WATER 7

TABLE IV: FLUORIDE RECORD SHEET SUMMARIES 9

TABLE V: COMPLIANCE FOR 1985 13

INTRODUCTION

This fluoride summary compiled by the Municipal Engineering Branch of the Pollution Control Division is for the period of January 1985 to December 1985. It is a yearly summary of the fluoride data received from the municipalities that artificially fluoridate. In 1985 the total number of water treatment plants adding fluoride to their water supply was 51.

There are an additional 21 communities that purchased treated water from communities that fluoridate. The percentage of the population using fluoride adjusted water was 53.7%. This is calculated from the population served by water works facilities. The amount of water fluoridated was 186,000,000 m^3.

Each municipality that fluoridates is required to submit a monthly report to the Director of Pollution Control by the fifteenth day of the following month. Included in the monthly report is the daily amount of fluoride used, the amount of water fluoridated, and the fluoride content of the raw and fluoridated water as determined by laboratory analysis. A raw and treated sample of water are to be submitted to the Department laboratory for fluoride analysis monthly. The amount of actual fluoride added to the water is calculated using the data compiled from the summary sheets.

DISCUSSION OF TABLES

Table I Abbreviations lists chemical formulas, metric symbols and abbreviations used throughout the report.

Tables II and III consist of historical data to the present. Table II-Fluoride Summary Statistics-indicates there is an increase in the number of treatment plants that are adding fluoride. Coleman, High Level, Ponoka, and Sexsmith contributed to that increase by starting up their fluoridation in 1985. The number of treatment plants which use either hydrofluosilicic acid, sodium silicofluoride, or sodium fluoride and the amounts of chemical used are listed. Total amount of water fluoridated is also given. As can be seen, the volume of water being fluoridated is increasing yearly.

Table III-Communities Using Fluoride Adjusted Water-lists the communities which receive fluoride adjusted water, their populations, and the years they began fluoridating. As well, the 21 communities that purchased treated water from communities that fluoridate are listed along with the year they started. The percentage of the population using fluoride adjusted water is at 53.7%. This figure is arrived at by dividing the total population of those communities which received fluoridated water (1,033,432) by the total population of those communities which are served by water treatment facilities (1,926,022).

Table IV-Fluoride Record Sheet Summary-consists of an average of the yearly data recorded on the monthly fluoride record sheets submitted by the communities. The Table lists the chemical each community uses, the yearly totals and the monthly averages for both the water used and the water fluoridated.

Some communities did not fluoridate all year because of fluoride addition pump breakdown, testing equipment failure, or testing chemicals being back ordered. The fluoride chemical itself would sometimes not be available from the suppliers.

In the communities that did not fluoridate for the entire year, there is a difference in the amount of water used and the amount of water fluoridated. The amount of fluoride chemical added to the water is also included in Table IV. It is used along with the amount of water fluoridated to come up with a calculated fluoride value that is added to the water.

A raw water sample must be analyzed at least once a week and a treated water sample must be analyzed daily for fluoride. A raw and treated water sample for fluoride analysis must be submitted to the Alberta Environmental Centre once a month by the community. The raw results obtained from the Alberta Environmental Centre plus the fluoride added is used to determine the calculated total amount of fluoride added to the water. In some communities, the calculated value is different than what was actually tested by the Alberta Environmental Centre. This is due mostly to water metering problems, inaccurate meter readings, or inaccurate weigh scales due to corrosion caused by fluoride acid fuming.

In some communities there is a deviation between the community's test results and those obtained from the Alberta Environmental Centre. The major cause for these differences is because these communities are still using the SPADN's colorimetric method of testing, which is susceptible to interferences such as alum floc, turbidity, and water temperature. The branch is in the process of

standardizing the testing methods used by the communities to the specific ion method which is not so easily affected by these interferences.

The treated result used for compliance purposes is the community's daily tests. The Alberta Environmental Centre test results are used as a comparison of the community's test results to check the accuracy of their testing procedures.

Table V Compliance for 1985 shows that a 97% compliance has been maintained.

RESULTS

Compliance has been maintained at the 1984 level.

TABLE I

ABBREVIATIONS

W.T.P.	water treatment plant
H_2SiF_6	Hydrofluosilicic Acid
Na_2SiF_6	Sodium Silicofluoride
NaF	Sodium Fluoride
m^3	cubic metres
kg	kilograms
mg/L	milligrams per litre (ppm)
F	fluoride
F'D	fluoridated

Municipal Engineering Branch
Pollution Control Division
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TABLE II
FLUORIDE SUMMARY STATISTICS

Year	Number of W.T.P. using Fluoride	H_2SiF_6		Na_2SiF_6		NaF		Amount of Water Fluoridated (1,000 m^3)
		Number of W.T.P.	Amount in kg	Number of W.T.P.	Amount in kg	Number of W.T.P.	Amount in kg	
1985	51	45	823,287	5	3,473	1	1,443	185,927
1984	49	43	828,687	5	3,304	1	1,087	185,621
1983	47	38 (Start of 83) 40 (End of 83)	763,200	8 (Start of 83) 6 (End of 83)	14,095	1	1,187	178,916
1982	49	38 (Start of 82) 9 (End of 82)	675,065	7 (Start of 82) 2 (End of 82)	20,172	4	2,111	164,751
1981	47	36	682,536	7	14,329	4	3,161	177,735
1980	44	33	739,474	7	11,208	4	2,559	167,532
1979	40	29	692,503	7	11,733	4	1,869	158,656

Municipal Engineering Branch
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TABLE III

COMMUNITIES USING FLUORIDE ADJUSTED WATER

	Year Commenced	1983 Population	1984 Population	1985 Population
Athabasca	1962	1862	1862	1933
Barrhead	1964	3736	3736	3849
Blairmore	1975	2321	2321	2664
Bonnyville	1962	4664	4786	5223
Bow Island	1968	1499	1499	1499
Cardston	1972	3267	3546	4012
Coaldale	1963	4671	4768	4819
Cold Lake	1969	2245	2515	2805
Coleman	1985	---	---	2893
Devon	1959	3931	3931	3931
Drayton Valley	1973	4867	4924	4982
Drumheller	1967	6671	6671	6671
Edmonton	1967	560085	560085	560085
Elkpoint	1984	---	1113	1208
Fairview	1958	2869	3234	3234
Falher	1977	1204	1188	1188
Forestburg	1980	955	956	973
Fort McMurray	1968	34494	35352	36810
Grande Prairie	1959	24076	24411	25056
Grimshaw	1983	2488	2488	2645
Hanna	1968	2996	3036	3036
Hays	1969	75	75	---
High Level	1985	---	---	2852
Hinton	1969	8825	8904	8904
Killam	1976	1005	1001	1001
Lac La Biche	1976	2069	2242	2242
Lethbridge	1976	58086	58586	59901
Manning	1981	1262	1262	1262
McLennan	1980	1176	1176	1176
Milk River	1964	894	894	894
Okotoks	1984	---	4919	4981
Peace River	1963	6043	6043	6043
Picture Butte	1966	1506	1562	1562
Pincher Creek	1968	3757	3712	3722
Ponoka	1985	---	---	5221
Provost	1979	1757	1734	1779
Red Deer	1958	50257	51070	52620
Sexsmith	1985	---	---	4838
Slave Lake	1973	4562	4838	4838
Smoky Lake	1982	1165	1165	1165
St. Paul	1968	4963	4963	5052
Spirit River	1981	1104	1104	1104
CFB Suffield	1963	1000	1000	1000
Swan Hills	1983	2497	2497	2497
Taber	1970	5988	6384	6384
Thorsby	1977	737	737	737
Valleyview	1976	2232	2232	2232
Vauxhall	1974	1076	1076	1076

Table III continued

TABLE III concluded

	Year Commenced	1983 Population	1984 Population	1985 Population
Vermilion	1977	3745	3769	3818
Viking	1976	1238	1238	1238
Westlock	1968	4432	4432	4432
Wetaskiwin	1974	10022	10022	10022
Whitecourt	1965	5408	5408	5408
TOTAL 1		855,781	866,467	889,517

NOTE: Blanks indicate not fluoridating that year.

COMMUNITIES SUPPLIED BY OTHER MUNICIPALITIES' WATER SYSTEM

	Year Commenced	1983 Population	1984 Population	1985 Population
Communities Supplied by Edmonton Water System				
Beaumont	1960	3202	3468	3723
Bruderheim	1982	1238	1238	1238
CFB Namao	1951	3000	3000	3000
Calmar	1981	1118	1137	1137
Chipman	1982	281	281	281
Fort Saskatchewan	1970	12474	12474	12474
Gibbons	1976	2592	2620	2620
Lamont	1982	1673	1673	1673
Leduc	1960	12471	12471	12926
Morinville	1981	5109	5247	5273
Mundare	1982	655	655	655
Redwater	1970	2197	2197	2197
Sherwood Park	1951	26534	26534	30000
Spruce Grove	1971	11307	11569	11569
St. Albert	1957	35032	35529	35620
Stony Plain	1971	5136	5136	5291
Vegreville	1983	5251	5251	5251
TOTAL 2		129,270	130,549	134,928
Communities on the Cold Lake Water Line				
CFB Cold Lake		5000	5000	5000
Grand Centre		3195	3195	3506
TOTAL 3		8146	8195	8506
Communities on the Drumheller Water Line				
Munson (hauled in)		148	148	148
Nacmine		333	333	333
TOTAL 4		481	481	481
TOTALS of 1, 2, 3, 4		993,678	1,005,692	1,033,432

1985 Total Population Served by Waterworks Facilities - 1,926,022
% of Population Using Fluoride Adjusted Water - 53.7

Municipal Engineering Branch
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TABLE IV
FLUORIDE RECORD SHEET SUMMARY
1985

Upper Number - Yearly Total
Lower Number - Monthly Average
(Based on months of fluoridation operation)

ALBERTA ENVIRONMENT
ENVIRONMENTAL PROTECTION SERVICES
POLLUTION CONTROL DIVISION
MUNICIPAL ENGINEERING BRANCH

COMMUNITY	CHEMICAL USED	WATER USED 1000 m^3	WATER F'D 1000 m^3	CHEMICAL ADDED Kg	F ADDED mg/L	COMMUNITY TESTS RAW	COMMUNITY TESTS TREATED	CALC TOTAL mg/L	LABORATORY TESTS RAW	LABORATORY TESTS TREATED
ATHABASCA	H_2SiF_6	350.398	350.398	1665.00						
		29.200	29.200	138.75	0.92	0.11	1.06	1.04	0.12	1.01
BARRHEAD	Na_2SiF_6	544.192	536.638	807.42						
		54.419	53.664	80.74	0.84	0.15	1.03	0.98	0.14	1.00
BLAIRMORE	H_2SiF_6	1007.864	1007.864	4181.23						
		100.786	100.786	418.12	0.84	0.24	0.93	1.01	0.17	0.80
BONNYVILLE	NaF	803.608	803.608	1443.20						
		66.967	67.051	120.27	0.79	0.24	0.97	0.99	0.20	0.95
BOW ISLAND	H_2SiF_6	258.369	230.796	660.00						
		25.837	25.644	73.33	0.55	0.25	0.95	0.67	0.12	0.51
CARDSTON	H_2SiF_6	1410.006	1377.721	5990.65						
		117.501	114.810	499.22	0.85	0.23	1.04	0.99	0.14	0.98
COALDALE	H_2SiF_6	981.470	981.398	3523.08						
		98.147	98.140	352.31	0.75	0.21	0.97	0.84	0.09	0.97
COLD LAKE	H_2SiF_6	2768.557	1166.557	3550.00						
		553.711	233.311	710.00	0.68	0.33	0.80	0.78	0.10	0.61
COLEMAN	H_2SiF_6	609.332	589.975	2489.05						
		87.047	84.282	355.58	0.82	0.33	1.03	1.01	0.30	0.96
DEVON	H_2SiF_6	563.031	563.031	2709.36						
		46.919	46.919	225.78	0.95	0.15	1.05	1.10	0.15	1.21
DRAYTON VALLEY	H_2SiF_6	887.241	781.048	4210.30						
		73.937	71.004	382.75	1.06	0.28	1.03	1.25	0.19	1.16
DRUMHELLER	H_2SiF_6	1286.030	1286.030	4877.45						
		107.169	107.169	406.45	0.73	0.29	1.00	0.95	0.21	1.07
EDMONTON ROSSDALE	H_2SiF_6	71739.053	71739.053	331546.00						
		5978.254	5978.254	27628.83	0.90	0.14	1.01	1.06	1.29	1.04

TABLE IV (CON'T)
FLUORIDE RECORD SHEET SUMMARY
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(Based on months of fluoridation operation)

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POLLUTION CONTROL DIVISION
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COMMUNITY	CHEMICAL USED	WATER USED 1000 m^3	WATER F'D 1000 m^3	CHEMICAL ADDED Kg	F ADDED mg/L	COMMUNITY TESTS RAW	COMMUNITY TESTS TREATED	CALC TOTAL mg/L	LABORATORY TESTS RAW	LABORATORY TESTS TREATED
EDMONTON E.L SMITH	H_2SiF_6	49269.240	49269.240	227525.00						
		4479.022	4479.022	20684.09	0.91	0.14	1.02	1.03	0.12	1.02
ELK POINT	H_2SiF_6	214.010	214.010	771.34						
		17.834	17.834	64.28	0.72	0.23	0.99	0.90	0.18	0.86
FAIRVIEW	H_2SiF_6	511.232	511.232	2124.80						
		42.603	42.603	177.07	0.83	0.16	1.02	0.97	0.19	1.00
FALHER	H_2SiF_6	130.339	130.339	449.64						
		10.862	10.862	37.47	0.69	0.22	1.01	0.88	0.19	0.89
FORESTBURG	H_2SiF_6	119.531	118.189	420.83						
		10.866	10.744	38.26	0.74	0.13	0.99	0.90	0.16	0.95
FORT MCMURRAY	H_2SiF_6	5176.004	4976.004	30137.88						
		431.334	414.667	2511.49	1.13	0.17	1.04	1.23	0.10	1.05
GRANDE PRAIRIE	H_2SiF_6	3337.744	3263.640	13472.74						
		278.145	271.970	1122.73	0.82	0.18	0.99	0.90	0.08	0.82
GRIMSHAW	H_2SiF_6	355.848	355.848	1302.50						
		29.654	29.654	108.54	0.72	0.29	1.04	0.95	0.23	1.03
HANNA	H_2SiF_6	509.877	509.877	1930.95						
		42.490	42.490	160.91	0.75	0.33	1.09	1.01	0.26	0.97
HAYS	Na_2SiF_6	26.974	26.974	70.15						
		2.248	2.248	5.85	1.60	0.38	1.04	1.85	0.25	1.07
HINTON	H_2SiF_6	2126.895	1969.609	9440.23						
		177.241	164.134	786.69	1.00	0.22	1.02	1.13	0.13	0.87
KILLAM	H_2SiF_6	188.514	188.514	626.86						
		15.710	15.710	52.24	0.66	0.39	1.00	0.83	0.17	0.92
LAC LA BICHE	H_2SiF_6	455.738	445.913	1761.15						
		50.638	49.546	195.68	0.74	0.22	0.96	0.94	0.20	0.72

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LETHBRIDGE	H_2SiF_6	16483.000	16483.000	72588.00						
		1373.583	1373.583	6049.00	0.88	0.18	1.01	1.00	0.12	0.96
MANNING	H_2SiF_6	199.519	199.519	827.27						
		18.138	18.138	75.21	0.82	0.21	1.05	0.99	0.17	0.96
MCLENNAN	H_2SiF_6	151.540	151.540	439.75						
		12.628	12.628	36.65	0.59	0.63	1.19	0.83	0.24	0.90
MILK RIVER	H_2SiF_6	463.103	439.017	1521.38						
		38.592	39.911	138.31	0.72	0.30	1.06	0.87	0.15	0.96
OKOTOKS	H_2SiF_6	1217.803	1217.803	4409.98						
		101.484	101.484	367.50	0.72	0.26	1.00	0.94	0.22	1.00
PEACE RIVER	H_2SiF_6	1434.572	1434.572	3731.59						
		119.548	119.548	310.97	0.52	0.15	0.99	0.58	0.06	0.96
PICTURE BUTTE	H_2SiF_6	342.527	342.527	1187.28						
		28.544	28.544	98.94	0.72	0.34	1.00	0.96	0.24	0.94
PINCHER CREEK	H_2SiF_6	1287.758	1198.799	5927.58						
		107.313	108.982	538.87	0.98	0.14	1.01	1.05	0.07	1.00
PONOKA	H_2SiF_6	579.241	579.241	1900.51						
		72.405	72.405	237.56	0.59	0.41	1.02	1.05	0.46	0.97
PROVOST	H_2SiF_6	243.659	240.378	651.63						
		22.151	21.853	59.24	0.53	0.20	1.05	0.66	0.13	0.97
RED DEER	H_2SiF_6	10679.340	10679.340	44844.00						
		889.945	889.945	3737.00	0.83	0.20	1.01	1.00	0.17	1.03
ST. PAUL	Na_2SiF_6	921.249	921.249	1128.11						
		76.771	76.771	94.01	0.73	0.24	1.02	0.93	0.20	0.96
SLAVE LAKE	H_2SiF_6	884.565	884.565	4064.68						
		73.714	73.714	338.72	0.91	0.22	1.00	1.00	0.09	0.84

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COMMUNITY	CHEMICAL USED	WATER USED 1000 m^3	WATER F'D 1000 m^3	CHEMICAL ADDED Kg	F ADDED mg/L	COMMUNITY TESTS RAW	COMMUNITY TESTS TREATED	CALC TOTAL mg/L	LABORATORY TESTS RAW	LABORATORY TESTS TREATED
SMOKY LAKE	H_2SiF_6	169.955	169.955	748.30						
		14.163	14.163	62.36	0.88	0.46	1.11	1.10	0.22	1.13
SPIRIT RIVER	H_2SiF_6	133.148	133.148	579.24						
		11.096	11.096	48.27	0.86	0.55	1.18	1.02	0.16	1.02
CFB SUFFIELD	Na_2SiF_6	499.968	499.968	699.45						
		49.997	49.997	69.95	0.84	0.24	1.04	1.00	0.16	0.99
SWAN HILLS	H_2SiF_6	254.025	254.025	1161.31						
		28.225	28.225	129.03	0.90	0.24	1.05	1.06	0.16	0.98
TABER	H_2SiF_6	1910.273	1910.273	7354.18						
		191.027	191.027	735.42	0.77	0.13	1.03	0.85	0.08	0.94
THORSBY	H_2SiF_6	81.420	81.420	334.32						
		7.402	7.402	30.39	0.81	0.33	1.17	1.03	0.22	1.03
VALLEYVIEW	H_2SiF_6	700.960	700.960	1804.45						
		58.413	58.413	150.37	0.51	0.48	1.08	0.58	0.07	1.00
VAUXHALL	H_2SiF_6	302.640	302.640	1266.00						
		25.220	25.220	105.50	0.83	0.25	1.09	1.02	0.19	1.15
VERMILION	H_2SiF_6	584.917	584.917	1447.10						
		58.492	58.492	144.71	0.49	0.42	0.98	0.75	0.26	0.74
VIKING	H_2SiF_6	210.456	204.828	579.05						
		17.538	17.069	48.25	0.55	0.32	1.13	0.79	0.24	1.09
WESTLOCK	Na_2SiF_6	612.821	612.821	767.42						
		68.091	68.091	85.27	0.77	0.43	1.04	0.89	0.12	1.03
WETASKIWIN	H_2SiF_6	1315.476	1315.476	5664.60						
		109.623	109.623	472.05	0.95	0.30	1.06	1.21	0.26	1.13
WHITECOURT	H_2SiF_6	991.645	991.645	4888.41						
		82.637	82.637	407.37	0.97	0.11	1.02	1.08	0.11	1.09

TABLE V
COMPLIANCE FOR 1985

	Jan	Feb	Mar	April	May	June	July	August	Sept	Oct	Nov	Dec	Total
Fluoride summary submitted by the 15th (% of communities)	89%	86%	93%	94%	86%	86%	96%	85%	89%	93%	98%	94%	91%
Raw water sample analyzed once a week (% of communities)	98%	98%	100%	96%	98%	100%	100%	94%	100%	100%	100%	100%	99%
Treated Fluoride content analyzed daily (% of days)	99%	98%	98%	98%	98%	99%	96%	97%	97%	97%	98%	98%	98%
Raw or treated samples submitted for fluoride analysis (% of com.)	94%	83%	89%	94%	98%	96%	94%	94%	94%	92%	90%	94%	93%
Not Exceed the daily allowable variation of $\pm$0.2 mg/L (% of days)	98%	98%	99%	98%	98%	97%	95%	96%	96%	96%	98%	97%	97%
Not Exceed monthly average allowable variation of $\pm$0.1 mg/L (% of Communities)	92%	94%	96%	94%	98%	89%	90%	90%	96%	90%	98%	96%	94%
Overall Compliance	98%	98%	99%	98%	98%	98%	96%	96%	96%	96%	98%	98%	97%

Note: In 1985 there was 97.0% compliance of the 39,886 possible contraventions.